

What is claimed is:

1. A system for certifying security inspection system operators, comprising:
an x-ray inspection machine for inspecting baggage items;
5 a threat item image database including a plurality of certification images of which
an operator must properly detect a predetermined percentage to obtain a passing
certification score;
a monitor for displaying threat item images from the threat item image database,
and for displaying x-ray images of baggage items;
10 software for accessing the threat item image database to electronically produce a
threat item image such that it appears on the monitor as if a threat item is located inside
a baggage item; and
an input device for allowing the operator to indicate when the operator believes
that a threat item image appears on the monitor.
15
2. A system according to claim 1 wherein the threat item image database
further includes training images, the detection of which do not factor into calculating the
certification score.
- 20 3. A system according to claim 2 wherein the software randomly selects
certification images and training images from the threat item image database for
displaying on the monitor.

4. A system according to claim 2 wherein the certification images and the training images are stored in separate libraries within the threat item image database.

5. A system according to claim 1 further comprising an operator performance database accessible by the software for storing operator performance records.

6. A system according to claim 1 further comprising a certification criteria database accessible by the software containing requirements for operator certification.

7. A system according to claim 1 further comprising a conveyor belt for moving baggage items into and out of the x-ray machine.

8. A system according to claim 1 wherein the certification images include images of at least one of bombs, knives, guns, and improvised explosive devices.

9. A system according to claim 1 wherein each certification image and an orientation angle of each certification image is associated with a detection difficulty level that is used in calculating the certification score.

10. A system according to claim 1 wherein the x-ray images of baggage items are images of actual baggage items located inside the x-ray machine.

11. A system according to claim 1 wherein the x-ray images of baggage items are electronically generated by the software.

12. A system according to claim 1 further comprising reporting means in
5 communication with the processor for reporting an operator certification score to an operator certification authority such that the certification score may be evaluated.

13. A system for uniform certification of security inspection system operators, comprising:

an x-ray inspection machine for inspecting baggage items;

a threat item image database including a plurality of standardized certification
images of which an operator must properly detect a predetermined percentage to obtain
a passing certification score;

a monitor for displaying threat item images from the threat item image database,
and for displaying x-ray images of baggage items located inside the x-ray inspection
machine;

software for accessing the threat item image database to electronically produce a
threat item image such that it appears on the monitor as if a threat item is located inside
a baggage item;

20 an input device for allowing the operator to indicate when the operator believes
that a threat item image appears on the monitor;

an operator performance database accessible by the software for storing
operator performance records; and

a certification criteria database accessible by the software containing operator certification requirements.

14. A system according to claim 13 wherein the software compares an operator performance record to the operator certification requirements to determine whether an operator has met requirements for certification.

15. A system according to claim 13 further comprising a data transmission means for transmitting operator performance data obtained during operator testing to the operator performance database.

16. A system according to claim 13 wherein at least one of the software, the operator performance database, and the certification criteria database is located at a location remote from the x-ray inspection machine.

17. A system according to claim 13 further comprising data collection means in communication with the software for collecting data used to create the operator performance records.

18. A system according to claim 13 wherein the threat item image database further includes training images, the detection of which do not factor into calculating the certification score.

19. A system according to claim 18 wherein the software is programmable to display a pre-determined set of training images to meet specific training needs of a given operator.

5 20. A system according to claim 13 wherein the software is programmable to display each certification image at least once during certification testing of an operator.

21. A method of certifying operators of security inspection systems, wherein baggage items are passed through an x-ray inspection machine, comprising the steps of:

10 displaying x-ray images of the baggage items on a monitor for viewing by an operator;

15 electronically inserting certification images of threat items into a selection of the x-ray images of baggage items;

20 providing an input device for allowing the operator to indicate when the operator believes that a threat item image appears on the monitor;

determining a number of certification images that the operator properly detected;

and

calculating an operator test score.

22. The method of claim 21 further comprising the steps of determining the number of times that the operator incorrectly identified an image as a threat item image, and factoring that number into the operator test score.

23. The method of claim 21 further comprising the step of randomly electronically inserting training images of threat items into a selection of the x-ray images of baggage items, the detection of which do not factor into calculating the operator test score.

24. The method of claim 21 wherein a random selection of certification images are inserted into a selection of the x-ray images of baggage items.

25. The method of claim 21 wherein a pre-determined set of certification images are inserted into a selection of the x-ray images of baggage items.

26. The method of claim 21 wherein the operator test score is calculated over a test period of several days.

27. The method of claim 26 wherein each of the certification images is displayed on the monitor at least once during the test period.

28. The method of claim 26 wherein the test period has a duration of at least 120 days.

29. The method of claim 21 further comprising the step of reporting the operator test score to an operator certification authority for evaluation of the operator test score.

5 30. The method of claim 21 further comprising the steps of recording detection performance of the operator in a performance record, and storing the performance record in an operator performance database.

31. The method of claim 30 wherein the performance record includes data relating to the number of times that the operator correctly identified a certification image, the number of times that the operator incorrectly identified an image as a threat item image, and the number of times that the operator failed to detect a certification image.

32. The method of claim 30 wherein the step of calculating the operator test score comprises comparing the operator performance record to certification requirements stored in a certification criteria database.

10067508-024103

33. A method of testing operators of security inspection systems, wherein an operator must detect a predetermined percentage of certification images of threat items to obtain certification, comprising the steps of:

displaying x-ray images of baggage items on a monitor to be viewed by the

5 operator;

electronically inserting images of threat items into a selection of the x-ray images of baggage items;

providing an input device for allowing the operator to indicate when the operator believes that a threat item image is detected on the monitor;

determining how many certification images the operator properly detected;

calculating an operator test score; and

reporting the operator test score.

34. The method of claim 33 further comprising the step of running actual baggage items through an x-ray machine to generate the x-ray images of baggage items.

35. The method of claim 33 further comprising the step of electronically generating the x-ray images of baggage items.

36. The method of claim 33 further comprising the steps of instructing the operator to enter a personal password before operating an x-ray inspection system, and

20067508-02102
204420-80579000

20

preventing the operator from operating the x-ray inspection system until a proper password has been entered.

37. The method of claim 33 further comprising the step of storing a
5 performance record of the operator in an operator performance database.

38. The method of claim 37 wherein the performance record includes data relating to the number of times that the operator correctly identified a certification image, the number of times that the operator incorrectly identified an image as a threat item
10 image, and the number of times that the operator failed to detect a certification image.

39. The method of claim 37 further comprising the step of comparing the performance record to operator certification requirements stored in a certification criteria database to determine whether the operator has met the certification requirements.
15

40. The method of claim 33 wherein the electronically inserted threat item images include only certification images.
20

41. The method of claim 33 wherein the electronically inserted threat item images include certification images and training images that are randomly inserted into the x-ray images of baggage items.

42. The method of claim 41 wherein the detection of training images by the operator does not factor into calculating the operator test score.

43. A method of testing operators of security inspection systems over a test period of a pre-determined number of days, wherein an operator must detect a predetermined percentage of certification images of threat items during the test period to obtain certification, comprising the steps of:

displaying x-ray images of baggage items on a monitor to be viewed by the operator;

electronically inserting a random selection of certification images into a selection of the x-ray images of baggage items;

electronically inserting training images into a selection of the x-ray images of baggage items;

increasing the frequency at which the certification images are inserted as the test period nears an end, to ensure that each of the certification images is inserted at least once during the test period;

providing an input device allowing the operator to indicate when the operator believes that a threat item image is detected on the monitor;

determining how many certification images the operator properly detected;

calculating an operator test score based on the number of properly detected certification images, the number of certification images not detected, and the number of times that the operator improperly identified an image as a threat image.

44. The method of claim 43 further comprising the step of reporting the operator test score to an operator certification authority so that the test score may be evaluated to determine whether the operator qualifies for certification.

5 45. The method of claim 44 wherein the reporting step occurs before the test period ends if the operator can no longer detect a sufficient number of certification images during the remainder of the test period to achieve at least the predetermined percentage to obtain certification.

10 46. The method of claim 43 further comprising the step of ensuring that each certification image is electronically inserted into the x-ray images of baggage items a predetermined number of times.

15 47. The method of claim 46 wherein specified certification images are inserted more times than other certification images.

20 48. The method of claim 43 wherein each certification image and/or an orientation angle of each certification image is associated with a detection difficulty level that is used as a factor in calculating the operator test score.

49. The method of claim 48 further comprising the steps of tracking and recording the types of certification images, and their associated difficulty levels, that have been inserted into the x-ray images of baggage items during the test period.

50. The method of claim 48 further comprising the step of requiring the operator to properly detect at least one certification image from every difficulty level to obtain a passing test score.

5

THE UNIVERSITY OF CHICAGO